

CODE LETTERS FOR PROGRESS REPORT 98  
CONTINUOUS EVALUATION OF CORRUGATING MEDIUM  
PROJECT 1108-17

Company - Mill	Machine No.	Code Letter
The Chesapeake Corporation--West Point	1	--
Continental Can Company, Inc.--Hopewell	1	D
--Hodge	1	P
Crown Zellerbach Corporation--Baltimore	1	F
--Baltimore	2	U
--Bogalusa	4	J
--Lebanon	1	--
--Lebanon	2	C
International Paper Company--Arecibo	F	V
--Bastrop	1	S
--Bastrop	2	L
--Georgetown	1	H
The Mead Corporation--Harriman	1	N
--Knoxville	1	--
--Lynchburg	2	B
--Sylva	1	--
Olin Mathieson Chemical Corporation--Monroe	1	--
--Monroe	2	--
Owens-Illinois Glass Company--Big Island	3	A
--Tomahawk	1	K
--Tomahawk	2	O
--Tomahawk	3	E
Packaging Corporation of America--Filer City	1	G
--Filer City	2	M
St. Joe Paper Company--Port St. Joe	1	Q
St. Regis Container Corporation Mill Division--Coshocton	1	--
Union Bag-Camp Paper Corporation--Savannah	2	R
West Virginia Pulp and Paper Company--Covington	6	T
--Covington	7	--
--Charleston	--	--
Weyerhaeuser Company North Carolina Division--Plymouth	3	I

THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

Project 1108-17

Report 98

A Progress Report

to

FOURDRINIER KRAFT BOARD INSTITUTE, INC.

December 1, 1962

## TABLE OF CONTENTS

	Page
INTRODUCTION	1
NUMBER OF ROLLS OF CORRUGATING MEDIUM SUBMITTED FOR EVALUATION FROM EACH MACHINE	2
SUMMARY OF CURRENT MACHINE AVERAGES	4
GRAPHICAL PRESENTATIONS	5
SUMMARY OF TEST RESULTS FOR INDIVIDUAL MACHINES	7
DISCUSSION OF RESULTS	19
INSTITUTE AND MILL CONCORR FLAT CRUSH TEST RESULTS	21

# THE INSTITUTE OF PAPER CHEMISTRY

Appleton, Wisconsin

## CONTINUOUS EVALUATION OF CORRUGATING MEDIUM

### INTRODUCTION

As requested by the Technical Committee of the Fourdrinier Kraft Board Institute, Inc., the reports pertinent to the continuous evaluation of corrugating medium are prepared by The Institute of Paper Chemistry on a bimonthly basis instead of the previous monthly basis. This system was initiated on August 1, 1961. This eighth report under the bimonthly system presents results obtained during the months of October and November, 1962.

During this eighth bimonthly period, 145 rolls of corrugating medium representing the production of twenty-two machines were evaluated. A tabulation of the number of rolls submitted from each machine during the months of October and November, 1962, is given in Table I. In connection with the data given in Table I, it should be mentioned that, effective September 1, 1961, at the request of the Technical Committee, the limit on the number of rolls submitted for evaluation from each machine during a given month was reduced from six to four.

Each sample of corrugating medium was evaluated for basis weight, caliper, Concora flat crush (conditioned after fluting), H. and D. flat crush on single-faced board, and runnability. Runnability was measured by corrugating each roll under standardized conditions on the Institute's corrugator into A-flute board at 600 feet per minute with minimum tension. If unsatisfactory runnability occurred at this speed, the corrugator was slowed down in increments of 25 f.p.m. until satisfactory runnability was obtained--i.e., no ruptured flutes. If the medium fabricated satisfactorily at 600 f.p.m. with minimum tension, further runs were made at higher tensions to determine when cracking occurred. The higher tensions used were 0.5 lb. per inch, 1.0 lb. per inch, and 1.5 lb. per inch.

TABLE I

NUMBER OF ROLLS OF CORRUGATING MEDIUM SUBMITTED  
FOR EVALUATION FROM EACH MACHINE

October and November, 1962

Machine Code	Number of Rolls
A	5
B	8
C	8
D	8
E	8
F	6
G	8
H	7
I	7
J	6
K	8
L	7
M	8
N	8
O	8
P	6
Q	4
R	7
S	4
T	4
U	6
V	<u>4</u>
Total	145

Flat crush was determined on the single-faced board obtained at a speed of 600 f.p.m. with minimum tension. The flat crush results, in addition to supplying information about quality, will provide data which may be useful in studying the relationship between Concora flat crush and combined board flat crush for each participant's medium.

For each participating machine, the current machine averages associated with the current period are shown for each test in Table II and presented graphically in Fig. 1 to 4. The current machine average is the average of the test results obtained on all rolls of corrugating medium evaluated from a given machine during the current period. In addition to the test data obtained for the various machines, Table II also presents the current F.K.I. averages, cumulative F.K.I. averages, and the F.K.I. indexes. The current F.K.I. average for each test is the average of the test results for all machines participating in the study during a given period. The cumulative F.K.I. average for each test is determined by averaging the results for the previous twelve-month period excluding the result for the current period. The F.K.I. index for each test is obtained as follows:

$$\frac{\text{current F.K.I. average}}{\text{cumulative F.K.I. average}} \times 100 = \text{F.K.I. index (\%)}$$

The F.K.I. index provides a ready means of comparing the current quality with previous results. An index greater than 100% indicates that current quality is higher than the average result for the previous twelve periods; an index below 100% indicates that current quality is lower than the average result for the previous twelve periods.

The test results obtained on the sample lots submitted from the production of individual machines during October and November, 1962, are shown in Tables III through XXIV for Machines A through V, respectively. The maximum, minimum, and

TABLE II

SUMMARY OF CURRENT MACHINE AVERAGES  
October and November, 1962

Mill Code	Basis Weight, lb.	Caliper, points	Concora Flat Crush, p.s.i.	Single-Face Flat Crush, p.s.i.
A	26.5	10.3	36.6	32.8
B	27.1	10.1	38.0	34.1
C	26.1	9.8	31.6	29.2
D	27.3	11.2	40.0	36.2
E	27.6	10.5	38.1	32.6
F	29.0	9.9	33.3	31.2
G	26.7	10.5	33.7	29.1
H	27.6	10.4	38.6	33.4
I	26.5	9.8	37.6	34.3
J	28.1	10.8	35.2	32.9
K	26.5	10.2	36.7	32.5
L	26.3	10.7	39.1	35.2
M	26.7	9.7	36.1	31.9
N	28.7	11.6	35.3	30.0
O	26.8	10.2	38.7	33.2
P	27.2	10.2	39.9	35.6
Q	27.9	9.5	38.6	37.6
R	26.6	9.5	36.5	31.6
S	26.8	11.2	40.2	35.4
T	27.0	10.4	34.9	31.1
U	27.1	9.8	37.9	33.5
V	28.3	10.2	33.6	30.3
Current F.K.I. Average	27.2	10.3	36.8	32.9
Cumulative F.K.I. Average	27.2	10.3	36.5	33.0
F.K.I. Index, %	100.0	100.0	101.0	99.6

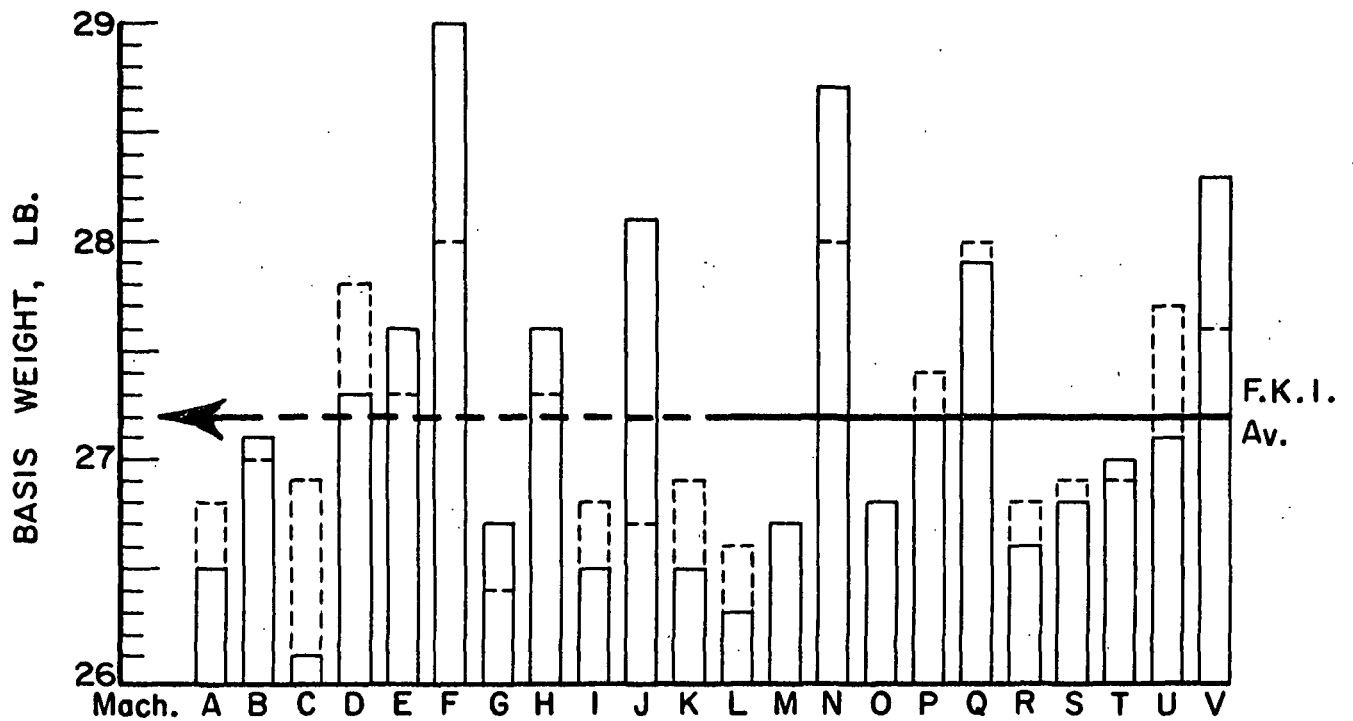


Figure 1. Comparison of Basis Weight Results

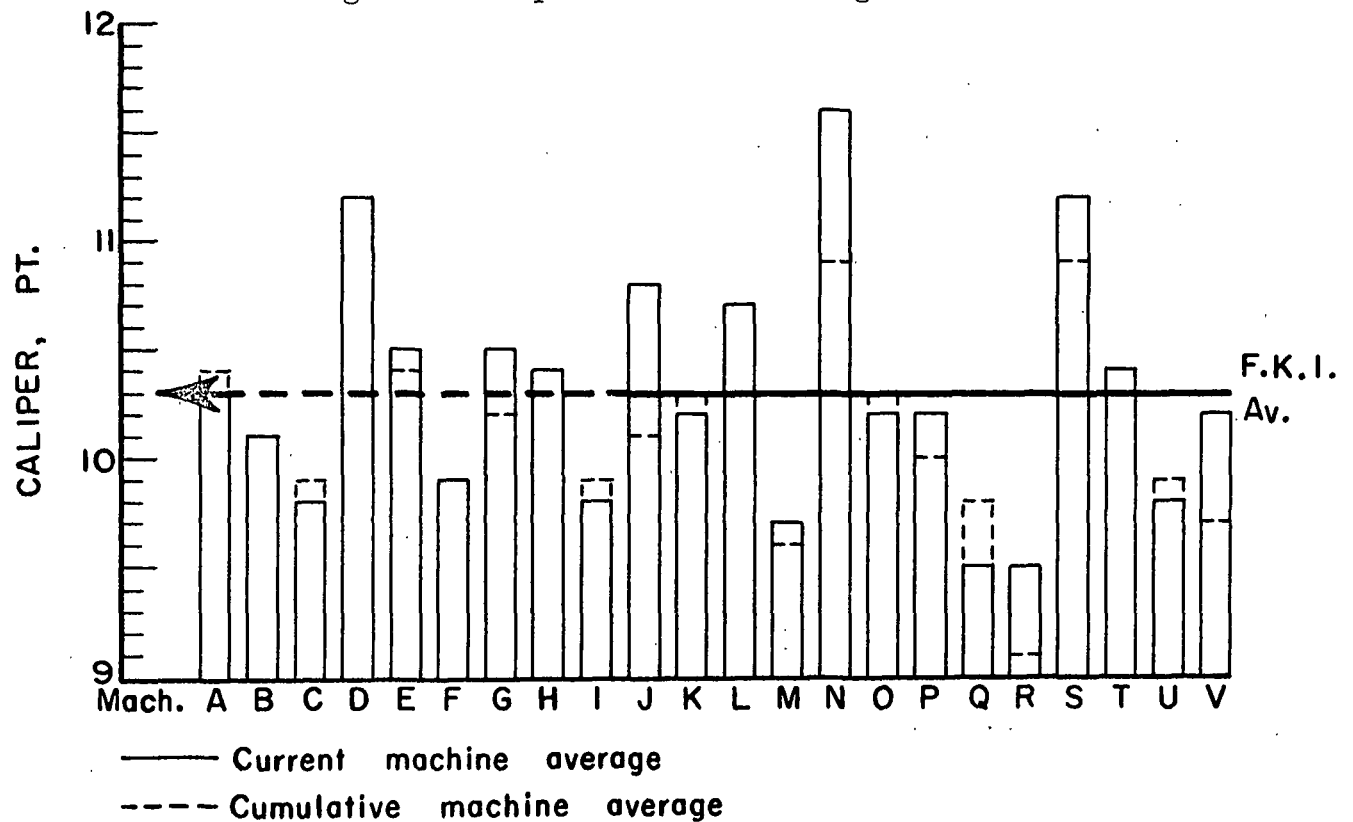


Figure 2. Comparison of Caliper Results



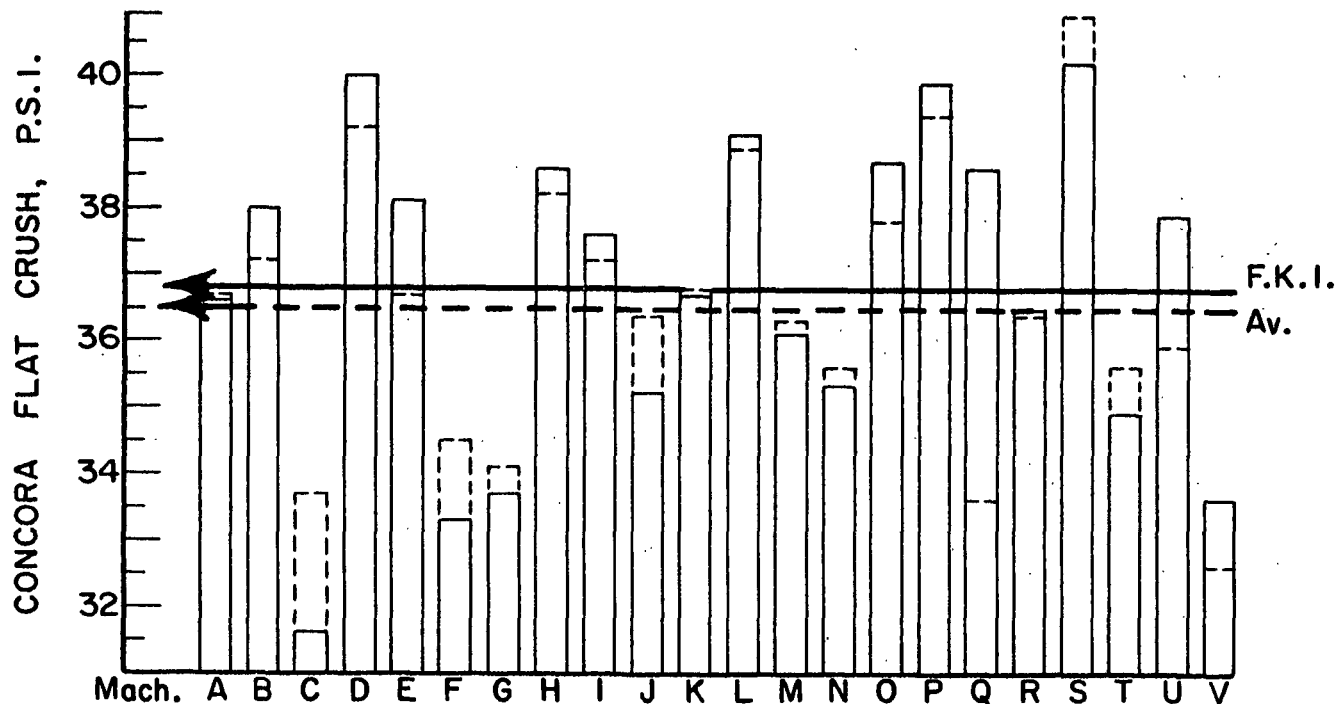


Figure 3. Comparison of Concora Flat Crush Results

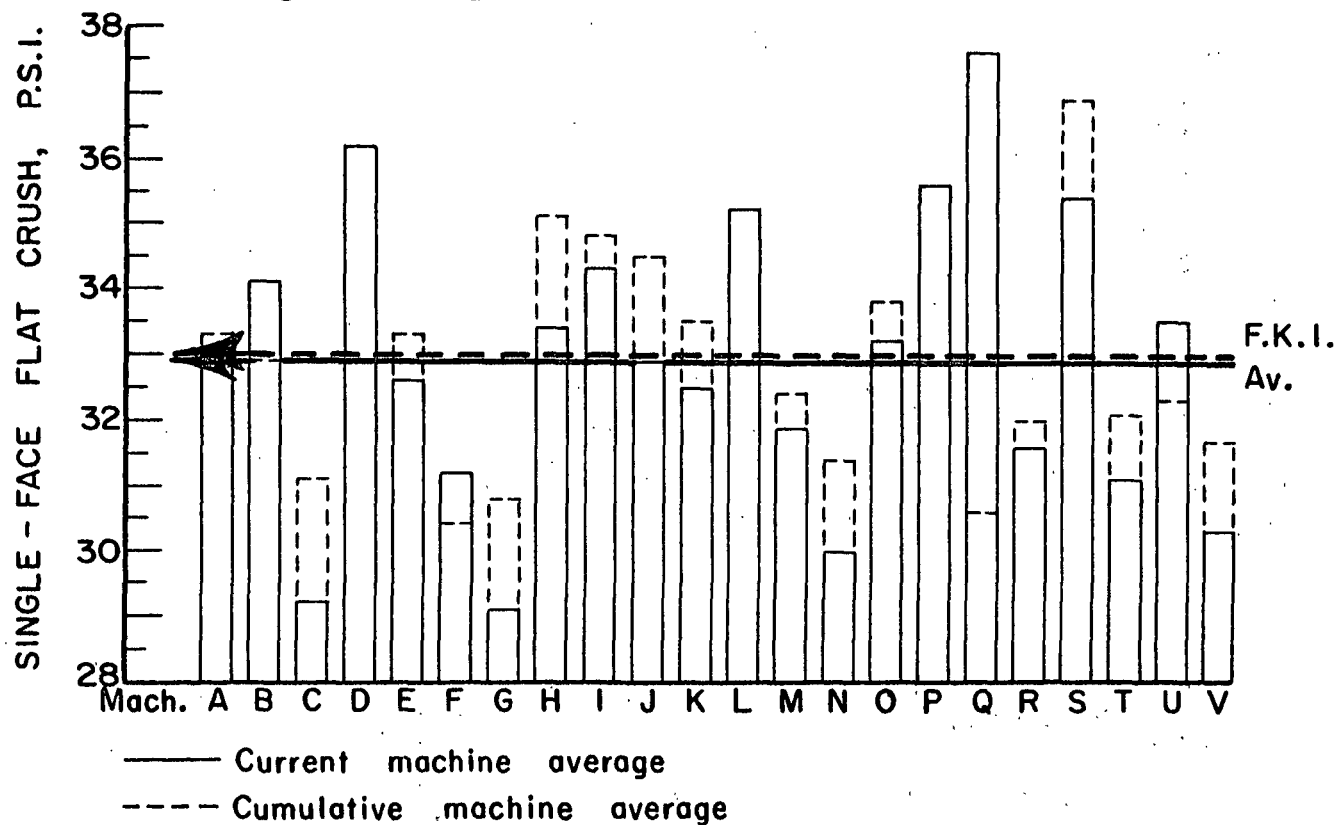


Figure 4. Comparison of Single-Face Flat Crush Results

TABLE III

SUMMARY OF TEST RESULTS FOR MACHINE A  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Max.	Min.	Max.	Min.	
A-1	9-28-62	10-30-62	5378	27.0	10.8	10.2	10.4	36.6	33.6	35.5	32.8
A-2	10-15-62	10-30-62	3356	26.3	10.8	10.1	10.3	38.4	34.2	36.2	32.8
A-3	10-18-62	11-2-62	3939	26.2	10.2	10.0	10.1	37.8	36.6	37.1	33.0
A-4	10-19-62	11-2-62	4189	27.0	10.8	10.1	10.5	38.4	35.4	37.0	33.5
A-5	11-10-62	11-21-62	1940	26.1	10.1	9.9	10.0	38.4	35.4	37.0	31.8
Current Machine Average				26.5			10.3				32.8
Cumulative Machine Average				26.8			10.4				33.3
Machine Factor, %				98.9			99.0				98.3
Machine Index, %				97.5			100.0				99.2

TABLE IV

SUMMARY OF TEST RESULTS FOR MACHINE B  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Max.	Min.	Max.	Min.	
B-1	9-23-62	10-3-62	797	26.9	10.3	9.0	10.0	39.6	34.8	36.8	33.7
B-2	9-23-62	10-3-62	798	27.0	10.3	9.2	10.0	39.6	33.0	35.8	33.1
B-3	10-8-62	10-15-62	805	26.8	10.1	9.5	9.8	42.0	36.6	39.0	35.7
B-4	10-8-62	10-15-62	806	26.3	10.0	9.6	9.8	39.0	36.6	38.0	33.5
B-5	10-22-62	10-29-62	813	28.1	10.7	10.1	10.4	42.6	37.2	39.5	35.2
B-6	10-22-62	10-29-62	814	28.0	10.9	9.7	10.2	41.4	37.2	39.6	34.9
B-7	10-30-62	11-5-62	821	26.6	10.9	9.2	10.2	46.2	31.8	36.6	32.8
B-8	10-30-62	11-5-62	822	27.4	11.0	10.0	10.6	43.8	34.8	38.6	34.2
Current Machine Average				27.1			10.1				34.1
Cumulative Machine Average				27.0			10.1				32.9
Machine Factor, %				100.6			100.0				103.8
Machine Index, %				99.8			98.6				103.3

TABLE V

SUMMARY OF TEST RESULTS FOR MACHINE C  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.			
					Max.	Min.	Av.	Max.	Min.	Av.		Max.	Min.	Av.
C-1	9-27-62	10-22-62	I-1	25.5	10.3	9.7	10.0	34.8	30.6	32.5	31.2	29.2	30.4	1-1/2
C-2	10- 5-62	10-22-62	J-1	26.1	10.8	9.3	10.0	36.0	32.4	34.0	31.0	28.6	29.9	1-1/2
C-3	10- 5-62	10-22-62	J-2	25.8	10.1	9.2	9.7	33.6	28.8	31.4	30.4	28.0	29.5	1-1/2
C-4	10- 5-62	10-22-62	J-3	26.5	10.0	9.2	9.7	37.2	29.4	34.0	31.4	29.6	30.8	1-1/2
C-5	10-28-62	11-13-62	J-1	26.5	9.9	9.2	9.6	31.2	28.2	29.8	29.2	26.8	27.6	1-1/2
C-6	10-30-62	11-13-62	J-2	26.2	10.7	9.3	10.1	31.8	28.2	30.2	29.2	27.6	28.2	Min.
C-7	10-30-62	11-13-62	J-3	26.2	10.0	9.2	9.8	32.4	28.2	30.5	31.0	28.6	29.8	Min.
C-8	10-30-62	11-13-62	J-4	26.3	10.0	9.2	9.7	32.4	28.8	30.6	29.0	26.4	27.8	Min.
Current Machine Average				26.1			9.8			31.6			29.2	
Cumulative Machine Average				26.9			9.9			33.7			31.1	
Machine Factor, %				97.1			99.4			93.8			94.1	
Machine Index, %				96.1			95.6			86.7			88.5	

TABLE VI

SUMMARY OF TEST RESULTS FOR MACHINE D  
October and November, 1962

D-1	9-19-62	10-3-62	378	28.2	11.7	11.0	11.4	47.4	40.8	44.0	42.8	40.6	41.5	1-1/2
D-2	9-25-62	10-3-62	379	27.8	11.8	11.0	11.6	46.2	39.0	42.1	41.6	39.0	40.1	1-1/2
D-3	10-3-62	10-18-62	380	27.2	12.0	11.0	11.3	43.2	34.8	39.6	36.8	33.4	35.1	1-1/2
D-4	10-9-62	10-18-62	381	27.9	12.2	11.2	11.8	43.2	37.2	40.1	38.6	35.2	36.3	1-1/2
D-5	10-15-62	11-5-62	382	26.3	11.2	10.8	11.0	40.8	33.6	37.8	36.8	33.6	35.0	1
D-6	10-23-62	11-5-62	383	26.0	11.0	10.4	10.8	40.2	34.2	37.6	35.8	33.4	34.7	1-1/2
D-7	11-8-62	11-19-62	384	27.6	11.3	10.8	11.0	40.8	36.6	39.1	35.2	33.6	34.3	1-1/2
D-8	11-12-62	11-19-62	385	27.5	11.2	10.8	11.0	40.2	37.2	39.5	34.0	32.4	33.0	1-1/2
Current Machine Average				27.3			11.2			40.0			36.2	
Cumulative Machine Average				27.8			11.2			39.2			36.2	
Machine Factor, %				98.1			100.0			101.9			100.0	
Machine Index, %				100.4			109.3			109.7			109.7	

TABLE VII

SUMMARY OF TEST RESULTS FOR MACHINE E  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.	
					Max.	Min.	Max.	Min.	Max.	Min.	Av.	Av.
E-1	10-9-62	10-15-62	--	26.6	10.8	10.1	10.5	39.6	37.2	38.2	31.1	1
E-2	10-10-62	10-15-62	--	27.2	11.0	10.5	10.8	37.8	35.4	36.5	32.0	1-1/2
E-3	10-11-62	10-23-62	--	28.7	11.6	11.0	11.2	40.8	36.6	38.4	33.2	1-1/2
E-4	10-17-62	10-23-62	--	27.9	10.7	10.1	10.3	37.8	35.4	36.7	31.1	1-1/2
E-5	11-9-62	11-21-62	--	26.7	10.8	10.1	10.4	38.4	33.6	36.4	30.2	1
E-6	11-10-62	11-21-62	--	28.0	11.0	10.2	10.5	42.0	36.6	40.2	36.0	1/2
E-7	11-11-62	11-21-62	--	27.9	10.5	10.1	10.3	40.8	38.4	39.6	33.8	1/2
E-8	11-13-62	11-21-62	--	28.0	10.7	10.2	10.4	40.2	36.6	39.1	33.3	1
Current Machine Average				27.6			10.5			38.1	32.6	
Cumulative Machine Average				27.3			10.4			36.7	33.3	
Machine Factor, %				101.1			101.6			103.9	97.7	
Machine Index, %				101.6			102.8			104.6	98.6	

TABLE VIII

SUMMARY OF TEST RESULTS FOR MACHINE F  
October and November, 1962

F-1	9-5-62	10-1-62	146	30.0	10.2	9.1	9.8	37.2	32.4	34.2	31.8	29.8	30.9	1-1/2
F-2	9-5-62	10-1-62	147	28.5	10.2	9.3	9.8	33.6	30.0	31.7	33.0	29.6	30.9	1-1/2
F-3	9-4-62	10-1-62	148	29.8	10.1	9.3	9.8	35.4	31.2	33.0	32.2	30.8	31.6	1-1/2
F-4	9-4-62	10-1-62	149	28.5	10.1	9.1	9.7	33.6	31.2	32.2	34.8	30.6	32.2	1-1/2
F-5	10-25-62	10-30-62	150	29.3	10.8	10.1	10.4	37.8	33.0	35.3	31.4	29.6	30.5	1-1/2
F-6	10-25-62	10-30-62	151	27.8	10.0	9.4	9.8	35.4	31.2	33.5	32.6	29.8	31.2	1-1/2
Current Machine Average				29.0			9.9			33.3			31.2	
Cumulative Machine Average				28.0			9.9			34.5			30.4	
Machine Factor, %				103.4			100.0			96.6			102.8	
Machine Index, %				106.6			96.3			91.3			94.5	

TABLE IX  
SUMMARY OF TEST RESULTS FOR MACHINE G  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.			
					Max.	Min.	Max.	Min.	Max.	Min.				
G-1	9-22-62	9-28-62	36	26.3	11.0	10.4	10.8	39.0	33.6	35.3	35.0	31.2	32.7	1-1/2
G-2	10- 1-62	10- 9-62	37	26.0	11.0	9.9	10.5	33.6	31.8	32.6	30.4	28.6	29.2	1-1/2
G-3	10- 9-62	11- 1-62	38	29.5	10.4	9.9	10.1	36.6	30.6	33.5	28.0	25.4	26.8	1-1/2
G-4	10-22-62	10-25-62	39	25.8	11.0	10.0	10.3	35.4	33.0	34.7	30.2	29.4	29.9	1-1/2
G-5	10-28-62	11- 2-62	40	26.8	11.0	10.3	10.7	38.4	30.6	34.8	31.2	29.2	30.0	1-1/2
G-6	11- 5-62	11- 8-62	41	26.5	11.4	10.3	11.0	33.6	30.6	32.2	28.2	26.8	27.5	1-1/2
G-7	11-12-62	11-16-62	42	26.3	10.8	10.0	10.3	33.6	31.2	32.3	28.6	27.6	28.1	1-1/2
G-8	11-17-62	11-23-62	43	26.2	10.2	9.8	10.0	36.0	31.8	34.6	29.4	27.4	28.6	1-1/2
Current Machine Average				26.7			10.5			33.7			29.1	
Cumulative Machine Average				26.4			10.2			34.1			30.8	
Machine Factor, %				101.0			102.6			98.9			94.4	
Machine Index, %				98.1			102.1			92.5			88.1	

TABLE X  
SUMMARY OF TEST RESULTS FOR MACHINE H  
October and November, 1962

H-1	9-11-62	10-22-62	508	27.8	11.1	10.2	10.9	39.0	35.4	37.2	33.4	31.6	32.3	1
H-2	9-24-62	10-22-62	509	26.7	10.5	10.0	10.2	37.8	34.8	36.6	31.6	29.6	30.6	1
H-3	10- 8-62	11-16-62	510	28.0	10.9	10.1	10.5	42.0	37.8	39.1	35.2	33.4	34.4	1-1/2
H-4	10-15-62	11-16-62	511	28.2	11.0	10.0	10.5	43.8	36.6	40.3	35.8	34.0	35.1	1-1/2
H-5	10-26-62	11-16-62	512	27.3	10.8	10.0	10.2	40.2	36.0	38.4	34.6	31.0	32.9	1-1/2
H-6	10-28-62	11-16-62	513	27.9	10.4	10.0	10.2	41.4	38.4	39.5	36.2	32.2	34.7	1-1/2
H-7	11- 1-62	11-21-62	514	27.4	10.6	10.1	10.3	40.8	37.8	39.2	35.0	32.0	33.7	1
Current Machine Average				27.6		10.4				38.6			33.4	
Cumulative Machine Average				27.3		10.4				38.2			35.1	
Machine Factor, %				101.1		100.0				101.1			95.2	
Machine Index, %				101.6		101.6				105.9			101.1	

TABLE XI  
SUMMARY OF TEST RESULTS FOR MACHINE I  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.
					Max.	Min.	Max.	Min.	Max.	Min.	
I-1	9-20-62	10-12-62	505	26.6	10.3	8.9	9.5	39.6	38.4	38.6	37.0
I-2	9-26-62	10-12-62	684	26.3	9.7	8.8	9.3	37.8	34.8	36.6	34.9
I-3	9-28-62	10-12-62	747	26.5	10.3	9.5	9.9	37.8	36.0	37.0	35.0
I-4	10-4-62	10-16-62	98	26.3	10.0	9.6	9.9	37.2	34.2	35.8	31.6
I-5	10-8-62	11-14-62	233	26.0	10.0	9.5	9.8	42.0	34.2	38.5	34.6
I-6	10-22-62	11-14-62	672	26.0	10.6	9.8	10.1	38.4	35.4	37.0	33.5
I-7	10-25-62	11-14-62	774	28.2	10.6	9.8	10.2	41.4	38.4	39.8	33.8
Current Machine Average				26.5			9.8			37.6	34.3
Cumulative Machine Average				26.8			9.9			37.2	34.8
Machine Factor, %				99.1			99.2			101.0	98.7
Machine Index, %				97.6			95.6			103.2	103.9

TABLE XII

SUMMARY OF TEST RESULTS FOR MACHINE J  
October and November, 1962

J-1	9-24-62	10-9-62	10	27.7	10.2	10.0	10.1	34.2	31.2	32.9	32.4	32.6	1-1/2
J-2	10-1-62	10-9-62	11	27.9	12.0	10.9	11.2	37.2	32.4	34.9	31.2	32.2	1/2
J-3	10-18-62	10-26-62	12	27.6	10.2	9.9	10.1	36.0	33.6	34.8	30.6	31.2	1-1/2
J-4	10-30-62	11-9-62	13	28.9	12.0	10.9	11.4	41.4	37.2	39.5	36.4	35.5	1
J-5	11-7-62	11-12-62	14	29.0	12.5	11.0	11.7	39.0	34.2	36.0	36.2	35.0	1/2
J-6	11-12-62	11-19-62	15	27.4	10.5	9.9	10.1	34.2	31.8	33.1	29.4	30.7	1
Current Machine Average				28.1			10.8			35.2		32.9	
Cumulative Machine Average				26.7			10.1			36.4		34.5	
Machine Factor, %				105.1			106.1			96.8		95.3	
Machine Index, %				103.3			104.9			96.6		99.6	

TABLE XIII  
SUMMARY OF TEST RESULTS FOR MACHINE K  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.		Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.	
				Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Av.	Av.
K-1	10-9-62	10-15-62	--	26.3	11.3	10.2	10.5	37.2	31.8	35.0	32.4	31.0	31.9
K-2	10-10-62	10-15-62	--	26.3	10.7	10.0	10.3	35.4	33.6	34.4	33.0	31.4	31.9
K-3	10-12-62	10-23-62	--	26.3	11.0	10.1	10.4	37.8	34.2	35.8	34.0	31.6	32.8
K-4	10-17-62	10-23-62	--	26.7	10.8	10.0	10.3	37.8	34.2	35.4	31.8	29.6	30.4
K-5	11-8-62	11-21-62	--	26.5	10.5	9.8	10.0	42.6	36.6	39.7	35.4	33.0	34.7
K-6	11-9-62	11-21-62	--	27.1	10.3	9.8	10.0	40.2	37.2	38.9	33.6	32.4	32.9
K-7	11-10-62	11-21-62	--	26.5	10.8	10.0	10.4	37.8	32.4	36.1	32.8	31.4	32.1
K-8	11-11-62	11-21-62	--	26.5	10.2	9.9	10.0	41.4	34.8	37.9	34.4	33.0	33.6
Current Machine Average				26.5			10.2			36.7			32.5
Cumulative Machine Average				26.9			10.3			36.8			33.5
Machine Factor, %				98.6			99.6			99.7			97.2
Machine Index, %				97.6			99.7			100.6			98.5

TABLE XIV  
SUMMARY OF TEST RESULTS FOR MACHINE L  
October and November, 1962

L-1	9-26-62	10-4-62	329	26.0	11.6	10.3	11.0	40.8	36.0	39.2	38.4	34.2	36.0	1-1/2
L-2	10-10-62	10-17-62	330	26.4	11.3	10.0	10.6	39.6	36.0	38.2	36.6	35.2	36.1	1-1/2
L-3	10-16-62	10-22-62	331	26.6	11.4	10.0	10.7	44.4	40.8	42.2	38.6	36.8	37.6	1-1/2
L-4	10-24-62	11-5-62	332	25.9	12.0	10.2	10.9	39.0	32.4	35.8	33.6	31.4	32.6	1
L-5	10-30-62	11-5-62	333	27.3	10.4	9.0	10.5	46.8	37.8	42.4	38.6	36.8	37.9	1-1/2
L-6	11-6-62	11-9-62	334	26.0	12.1	10.3	11.0	40.2	36.6	37.8	35.6	31.0	32.8	1-1/2
L-7	11-14-62	11-23-62	335	25.8	11.0	9.7	10.4	41.4	35.4	37.8	34.4	32.2	33.5	1-1/2
Current Machine Average				26.3			10.7			39.1			35.2	
Cumulative Machine Average				26.6			10.7			38.9			35.2	
Machine Factor, %				98.9			100.0			100.5			100.0	
Machine Index, %				96.7			104.6			107.1			106.6	

TABLE XV

SUMMARY OF TEST RESULTS FOR MACHINE M  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.			
					Max.	Min.	Max.	Min.	Max.	Min.				
M-1	9-22-62	9-28-62	36	25.5	10.6	8.9	9.7	38.4	31.8	35.5	34.0	32.6	33.5	1-1/2
M-2	10- 2-62	10- 9-62	37	26.8	11.5	9.7	10.4	41.4	34.8	38.0	34.6	32.6	33.7	1-1/2
M-3	10-12-62	10-17-62	38	29.0	9.3	8.5	8.9	40.2	34.8	36.5	32.2	30.8	31.6	1-1/2
M-4	10-22-62	10-25-62	39	25.7	11.1	8.9	9.8	36.6	33.6	35.4	33.0	31.4	32.2	1-1/2
M-5	10-28-62	11- 2-62	40	26.6	10.3	9.8	10.1	37.8	33.6	35.5	34.6	29.8	31.8	1-1/2
M-6	11- 5-62	11- 8-62	41	26.7	11.3	9.9	10.4	36.0	31.8	34.4	31.2	28.6	29.6	1-1/2
M-7	11-12-62	11-16-62	42	26.3	9.8	8.9	9.3	35.4	34.8	35.2	31.0	30.0	30.2	1-1/2
M-8	11-17-62	11-23-62	43	26.5	9.9	9.1	9.4	39.0	37.2	38.3	34.0	31.2	32.4	1-1/2
Current Machine Average				26.7			9.7			36.1			31.9	
Cumulative Machine Average				26.7			9.6			36.3			32.4	
Machine Factor, %				100.0			101.3			99.5			98.3	
Machine Index, %				98.0			95.0			99.0			96.5	

TABLE XVI

SUMMARY OF TEST RESULTS FOR MACHINE N  
October and November, 1962

N-1	9-25-62	10-4-62	802	27.9	11.2	10.8	11.0	39.0	36.0	37.6	34.4	32.0	33.2	1-1/2
N-2	9-25-62	10-4-62	803	28.4	11.3	10.9	11.2	40.2	36.0	37.7	33.4	31.8	32.5	1-1/2
N-3	10-25-62	11-2-62	810	29.1	12.8	12.1	12.4	39.6	31.8	34.7	29.4	27.2	28.8	Min.
N-4	10-25-62	11-2-62	811	28.6	12.3	11.8	12.0	34.8	30.6	32.3	29.4	27.4	28.5	1
N-5	10-25-62	11-2-62	818	29.3	12.7	12.0	12.2	38.4	33.0	35.0	30.4	28.0	29.2	1
N-6	10-25-62	11-2-62	819	29.3	12.3	11.9	12.1	37.2	33.6	35.2	28.6	27.4	28.1	1/2
N-7	11-13-62	11-19-62	826	28.4	11.4	10.9	11.0	38.4	32.4	35.2	31.0	29.0	29.8	1-1/2
N-8	11-13-62	11-19-62	827	28.4	11.3	10.9	11.1	37.8	33.0	35.2	33.2	27.4	30.1	1-1/2
Current Machine Average				28.7			11.6			35.3			30.0	
Cumulative Machine Average				28.0			10.9			35.6			31.4	
Machine Factor, %				102.4			107.1			99.1			95.7	
Machine Index, %				105.5			113.4			96.9			90.9	



TABLE XVII

SUMMARY OF TEST RESULTS FOR MACHINE O  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.			
					Max.	Min.	Max.	Min.	Max.	Min.				
O-1	10--9-62	10-15-62	--	26.9	10.5	10.0	10.2	41.4	36.0	38.4	32.8	31.6	32.3	1-1/2
O-2	10-10-62	10-15-62	--	26.6	10.4	10.0	10.1	39.6	36.0	37.4	33.8	31.2	32.4	1-1/2
O-3	10-11-62	10-23-62	--	26.9	11.5	10.1	10.5	37.8	34.2	36.6	32.4	30.6	31.4	1-1/2
O-4	10-17-62	10-23-62	--	27.3	11.0	10.0	10.3	41.4	40.2	40.7	35.2	33.8	34.3	1-1/2
O-5	11- 8-62	11-21-62	--	27.1	10.1	9.7	10.0	41.4	39.6	40.3	36.8	33.8	35.0	1-1/2
O-6	11- 9-62	11-21-62	--	26.2	10.1	9.1	9.8	45.0	37.8	40.4	36.0	33.8	35.0	1-1/2
O-7	11-10-62	11-21-62	--	26.8	10.4	10.0	10.2	40.2	37.8	39.0	35.2	33.0	34.0	1-1/2
O-8	11-13-62	11-21-62	--	26.6	10.3	10.0	10.1	39.0	34.8	36.7	33.0	29.6	31.4	1
Current Machine Average				26.8			10.2			38.7			33.2	
Cumulative Machine Average				26.8			10.3			37.8			33.8	
Machine Factor, %				100.0			98.9			102.4			98.2	
Machine Index, %				98.5			99.0			106.2			100.6	

TABLE XVIII

SUMMARY OF TEST RESULTS FOR MACHINE P  
October and November, 1962

P-1	9-22-62	10-9-62	58	26.4	9.9	9.2	9.7	42.0	39.6	40.7	37.8	35.0	36.6	1-1/2
P-2	9-23-62	10-9-62	59	26.8	10.1	9.8	10.0	42.0	39.0	40.6	38.4	35.4	36.4	1-1/2
P-3	10-1-62	10-18-62	60	27.4	10.5	10.0	10.2	40.8	38.4	39.8	35.6	33.0	34.6	1
P-4	10-8-62	10-18-62	61	28.0	11.1	10.8	10.9	40.2	36.0	37.8	35.0	33.6	34.4	1-1/2
P-5	10-14-62	10-29-62	62	27.9	10.8	10.0	10.4	43.8	38.4	41.3	36.8	35.4	36.4	1
P-6	10-21-62	11-1-62	63	26.5	10.0	9.8	9.9	40.2	38.4	39.1	36.2	34.8	35.4	1/2
Current Machine Average				27.2			10.2			39.9			35.6	
Cumulative Machine Average				27.4			10.0			39.4			35.6	
Machine Factor, %				99.1			101.3			101.3			100.0	
Machine Index, %				99.9			99.2			109.4			107.9	

TABLE XIX

SUMMARY OF TEST RESULTS FOR MACHINE Q  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m.,
					Max.	Min.	Max.	Min.	Max.	Min.	
Q-1	9-18-62	10-1-62	27	28.0	9.8	8.9	9.4	42.0	36.0	38.8	38.0 Min. a
Q-2	9-18-62	10-1-62	28	28.0	10.7	9.0	9.4	40.8	37.8	39.0	37.7 Note
Q-3	9-18-62	10-1-62	29	28.0	10.0	9.0	9.7	39.0	37.2	38.2	37.8 Min.
Q-4	9-18-62	10-1-62	30	27.7	11.2	8.7	9.6	40.8	37.2	38.5	36.9 Min.
Current Machine Average				27.9			9.5			38.6	37.6
Cumulative Machine Average				28.0			9.8			33.6	30.6
Machine Factor, %				99.6			97.3			115.0	122.8
Machine Index, %				102.6			92.9			105.9	113.8

a. Maximum speed at which this roll could be corrugated with minimum tension was 575 f.p.m.

TABLE XX

SUMMARY OF TEST RESULTS FOR MACHINE R  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m.,
					Max.	Min.	Max.	Min.	Max.	Min.	
R-1	9-19-62	9-28-62	512	25.8	9.2	9.0	9.1	36.6	34.2	35.4	32.4 1-1/2
R-2	9-30-62	10-12-62	513	27.5	9.8	9.3	9.5	37.2	32.4	35.2	33.2 1/2
R-3	10-7-62	10-12-62	514	26.0	10.0	9.2	9.5	38.4	34.2	35.8	31.4 1-1/2
R-4	10-11-62	10-16-62	515	27.0	10.0	9.4	9.8	39.6	36.0	37.8	31.6 1-1/2
R-5	10-15-62	10-22-62	516	26.8	10.2	9.8	10.0	38.4	36.6	37.7	30.0 1-1/2
R-6	11-2-62	11-9-62	517	26.4	10.0	9.8	9.9	39.6	34.8	36.8	31.3 1-1/2
R-7	11-7-62	11-16-62	518	26.8	9.2	9.0	9.1	40.2	31.2	37.2	31.5 1-1/2
Current Machine Average				26.6			9.5			36.5	31.6
Cumulative Machine Average				26.8			9.1			36.4	32.0
Machine Factor, %				99.5			104.7			100.4	98.7
Machine Index, %				97.9			93.0			100.3	95.8

# SUMMARY OF TEST RESULTS FOR MACHINE S

## October and November, 1962

Date		Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single- Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.				
Made	Received			Max.	Min.	Av.	Max.	Min.	Av.					
S-1	10-10-62	10-17-62	676	27.0	11.8	11.0	11.3	45.6	39.6	42.0	38.4	34.0	36.3	1-1/2
S-2	10-30-62	11- 5-62	677	27.1	11.4	11.0	11.2	42.0	37.2	40.0	38.8	36.6	37.5	1-1/2
S-3	11- 6-62	11- 9-62	678	26.3	12.5	11.0	11.4	41.4	36.0	38.8	34.8	31.4	33.1	1
S-4	11-13-62	11-19-62	679	26.5	11.7	10.1	10.8	43.2	34.8	40.2	36.2	33.4	34.5	1-1/2
Current Machine Average				26.8			11.2			40.2			35.4	
Cumulative Machine Average				26.9			10.9			41.0			36.9	
Machine Factor, %				99.3			102.5			98.1			95.9	
Machine Index, %				98.4			109.0			110.4			107.0	

# SUMMARY OF TEST RESULTS FOR MACHINE T

## October and November, 1962

Machine	9-19-62	10-18-62	219	26.5	11.0	10.3	10.6	37.2	33.0	34.7	31.2	29.0	29.7	1-1/2
T-1	9-19-62	10-18-62	219	26.5	11.0	10.3	10.6	37.2	33.0	34.7	31.2	29.0	29.7	1-1/2
T-2	10-4-62	10-18-62	220	27.1	10.3	10.0	10.1	36.0	31.8	34.8	34.6	32.2	32.9	1-1/2
T-3	10-19-62	11-14-62	221	27.1	10.8	9.9	10.3	36.6	33.6	34.9	31.6	28.8	30.3	1
T-4	11-1-62	11-14-62	222	27.4	11.0	10.1	10.6	36.6	32.4	35.3	32.6	30.2	31.6	1-1/2
Current Machine Average														
Cumulative Machine Average														
Machine Factor, %														
Machine Index, %														
27.0														
26.9														
100.4														
99.4														
10.4														
10.4														
100.0														
101.4														
34.9														
35.6														
98.1														
95.8														
31.1														
32.1														
96.9														
94.2														

TABLE XXIII

SUMMARY OF TEST RESULTS FOR MACHINE U  
October and November, 1962

Code	Date Made	Date Received	Mill Roll No.	Basis Weight, lb./M sq.ft.	Caliper, points		Concora Flat Crush, p.s.i.		Single-Face Flat Crush, p.s.i.		Runnability, maximum tension at 600 f.p.m., lb./in.	
					Max.	Min.	Max.	Min.	Max.	Min.		
U-1	9-17-62	10-1-62	149	26.7	10.0	8.7	9.3	39.6	34.8	35.2	32.8	34.0
U-2	9-17-62	10-1-62	150	26.6	10.2	9.2	9.6	40.8	37.2	38.4	35.6	36.8
U-3	9-18-62	10-1-62	151	26.9	10.2	9.2	9.8	40.8	36.0	36.4	34.6	35.5
U-4	9-18-62	10-1-62	152	26.8	10.2	8.7	9.6	43.2	37.8	35.4	33.8	34.6
U-5	10-25-62	10-30-62	153	27.7	11.0	10.0	10.2	37.8	33.6	30.6	28.8	30.0
U-6	10-26-62	10-30-62	154	27.9	11.0	10.0	10.5	37.2	34.8	32.6	28.8	30.5
Current Machine Average				27.1			9.8			37.9		33.5
Cumulative Machine Average				27.7			9.9			35.9		32.3
Machine Factor, %				98.0			99.7			105.7		103.8
Machine Index, %				99.7			95.9			104.0		101.6

<sup>a</sup>Maximum speed at which this roll could be corrugated with minimum tension was 475 f.p.m.

<sup>b</sup>Maximum speed at which this roll could be corrugated with minimum tension was 525 f.p.m.

TABLE XXIV

SUMMARY OF TEST RESULTS FOR MACHINE V  
October and November, 1962

V-1	9- 8-62	10-25-62	78	28.2	10.4	9.9	10.1	38.4	35.4	36.2	31.8	29.8	31.0
V-2	9-15-62	10-25-62	79	29.5	11.0	10.0	10.3	34.2	31.8	32.9	32.8	29.6	31.4
V-3	9-17-62	10-25-62	80	27.4	10.2	9.7	10.0	33.6	30.0	31.3	29.8	27.6	28.8
V-4	9-21-62	10-25-62	81	28.1	11.0	10.0	10.4	35.4	33.0	34.1	32.4	28.0	30.0
Current Machine Average				28.3			10.2			33.6			30.3
Cumulative Machine Average				27.6			9.7			32.6			31.7
Machine Factor, %				102.7			105.2			103.2			95.7
Machine Index, %				104.1			99.4			92.2			91.8

average test results obtained on each sample lot are shown for all tests except basis weight for which only the average is shown; in addition the over-all average result for all sample lots submitted from a given machine is shown for each test. The latter over-all averages are reported as "current machine averages." A cumulative machine average is also shown and is calculated by averaging the current machine averages for the previous twelve periods (excluding the current period). Also shown for each machine in Tables III to XXIV are the machine factor and machine index which are defined as follows:

$$\frac{\text{current machine average}}{\text{cumulative machine average}} \times 100 = \text{machine factor (\%)}$$

$$\frac{\text{current machine average}}{\text{cumulative F.K.I. average}} \times 100 = \text{machine index (\%)}$$

The machine factor and machine index provide a means for comparing the current machine average with either the previous results for that particular machine or with the cumulative results for all machines--i.e., the cumulative F.K.I. average.

## DISCUSSION OF RESULTS

Shown below from Table II are the maximum and minimum current machine averages noted for each test during the current period (October and November, 1962); the current machine average is the average of the results obtained on all rolls submitted from a given machine during the current period. Also given for each test is the current F.K.I. average which is determined by averaging the current machine averages for the current period and is indicative of the test level being maintained by the industry as a whole to the extent that the industry is represented by the participating machines:

	Maximum Current Machine Average	Minimum Current Machine Average	Current F.K.I. Average
Basis wt., lb.	29.0	26.1	27.2
Caliper, pt.	11.6	9.5	10.3
Concora flat crush, p.s.i.	40.2	31.6	36.8
Single-face flat crush, p.s.i.	37.6	29.1	32.9

The runnability data for the 145 rolls evaluated during the current period are summarized as follows:

Runnability	Number of Rolls	Percentage of Total Rolls
Less than 600 f.p.m. with minimum tension	4	2.8
600 f.p.m.--minimum tension	15	10.3
600 f.p.m.--1/2 lb. per in. tension	10	6.9
600 f.p.m.--1 lb. per in. tension	18	12.4
600 f.p.m.--1-1/2 lb. per in. tension	98	67.6

In Table XXV a comparison of Institute and mill Concora flat crush test results obtained on conditioned specimens is given for each machine for the current period. The inclusion of these comparisons is made possible by the fact that interested participants submit their Concora flat crush test results to The Institute of Paper Chemistry. This affords each participant the opportunity to review the level of agreement for his data with the levels shown for the other participants. Data sheets for supplying this information may be obtained from the Institute. Comparisons of this kind are a helpful adjunct to other calibration procedures. Shown in Table XXV are (1) the Institute and mill Concora averages for each roll included in these comparisons, (2) the difference between the roll average based on Institute data and that based on mill data, (3) the Institute and mill averages based on all rolls included in the comparison, and (4) the difference between these over-all averages.

The Concora flat crush data shown in Table XXV are summarized in Part I of Table XXVI where for each machine the following information is given: (1) Current machine average based on Institute data, (2) current machine average based on mill data, (3) the average difference--that is, the difference between the current machine average based on Institute data and that based on mill data, and (4) the maximum difference encountered in comparing Institute and mill test averages for individual rolls. In Part II of Table XXVI the average differences given in Part I have been converted to per cent. Comparative data from the previous two reports are also included in Part II of Table XXVI. It may be seen in Part II of Table XXVI that, for the current period, the highest average difference of 12.4% was associated with Machine U and the lowest of 0.3% with Machine O.

In Table XXVII a summary of the agreement between Institute and mill Concora flat crush data is given for the current period, and comparative data

TABLE XXV  
INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR OCTOBER AND NOVEMBER, 1962

Machine A					Machine B					Machine C							
Concora Flat Crush,					Concora Flat Crush,					Concora Flat Crush,							
Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence	Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence	Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence
A-1	5378	9-28-62	35.5	34.0	-1.5	B-1	797	9-23-62	36.8	36.0	-0.8	C-1	I-1	9-27-62	32.5	31.0	-1.5
A-2	3356	10-15-62	36.2	36.5	+0.3	B-2	798	9-23-62	35.8	36.6	+0.8	C-2	J-1	10-5-62	34.0	32.2	-1.8
A-3	3359	10-18-62	37.1	36.0	-1.1	B-3	805	10-8-62	39.0	36.3	-2.7	C-3	J-2	10-5-62	31.4	31.4	0.0
A-4	4189	10-19-62	37.0	35.3	-1.7	B-4	806	10-8-62	38.0	35.7	-2.3	C-4	J-3	10-5-62	34.0	32.4	-1.6
A-5	1940	11-10-62	37.0	35.0	-2.0	B-5	813	10-22-62	39.5	39.7	+0.2	C-5	J-1	10-28-62	29.8	32.5	+2.7
						B-6	814	10-22-62	39.6	37.7	-1.9	C-6	J-2	10-30-62	30.2	30.7	+0.5
						B-7	821	10-30-62	36.6	35.8	-0.8	C-7	J-3	10-30-62	30.5	32.3	+1.8
						B-8	822	10-30-62	38.6	37.0	-1.6	C-8	J-4	10-30-62	30.6	33.0	+2.4
Current Machine Av.			36.6	35.4	-1.2	Current Machine Av.			38.0	36.8	-1.2	Current Machine Av.			31.6	31.9	+0.3
Machine D					Machine E					Machine F							
Concora Flat Crush,					Concora Flat Crush,					Concora Flat Crush,							
Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence	Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence	Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence
D-1	378	9-19-62	44.0	38.0	-6.0	E-1	--	10-9-62	38.2	35.2	-3.0	F-1	146	9-5-62	34.2	37.0	+2.8
D-2	379	9-25-62	42.1	36.1	-6.0	E-2	--	10-10-62	36.5	38.2	+1.7	F-2	147	9-5-62	31.7	34.0	+2.3
D-3	380	10-3-62	39.6	36.0	-3.6	E-3	--	10-11-62	38.4	37.4	-1.0	F-3	148	9-4-62	33.0	36.3	+3.3
D-4	381	10-9-62	40.1	38.9	-1.2	E-4	--	10-17-62	36.7	35.5	-1.2	F-4	149	9-4-62	32.2	38.1	+5.9
D-5	382	10-15-62	37.8	39.5	+1.7	E-5	--	11-9-62	36.4	36.2	-0.2	F-5	150	10-25-62	35.3	37.2	+1.9
D-6	383	10-23-62	37.6	37.6	0.0	E-6	--	11-10-62	40.2	40.6	+0.4	F-6	151	10-25-62	33.5	34.9	+1.4
D-7	384	11-8-62	39.1	40.1	+1.0	E-7	--	11-11-62	39.6	40.0	+0.4						
D-8	385	11-12-62	39.5	37.4	-2.1	E-8	--	11-13-62	39.1	39.7	+0.6						
Current Machine Av.			40.0	38.0	-2.0	Current Machine Av.			38.1	37.8	-0.3	Current Machine Av.			33.3	36.2	+2.9
Machine G					Machine H					Machine I							
Concora Flat Crush,					Concora Flat Crush,					Concora Flat Crush,							
Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence	Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence	Code	Mill Roll No.	Date Made	Insti- tute	P.s.i. Mill	Differ- ence
G-1	36	9-22-62	35.3	34.8	-0.5	H-1	508	9-11-62	37.2	39.0	+1.8	I-1	505	9-20-62	38.6	37.4	-1.2
G-2	37	10-1-62	32.6	33.0	+0.4	H-2	509	9-24-62	36.6	40.3	+3.7	I-2	684	9-26-62	36.6	39.2	+2.6
G-3	38	10-9-62	33.5	32.9	-0.6	H-3	510	10-8-62	39.1	39.8	+0.7	I-3	747	9-28-62	37.0	39.7	+2.7
G-4	39	10-22-62	34.7	35.3	+0.6	H-4	511	10-15-62	40.3	41.0	+0.7	I-4	98	10-4-62	35.8	36.8	+1.0
G-5	40	10-28-62	34.8	36.6	+1.8	H-5	512	10-26-62	38.4	38.5	+0.1	I-5	233	10-8-62	38.5	38.8	+0.3
G-6	41	11-5-62	32.2	32.9	+0.7	H-6	513	10-28-62	39.5	37.7	-1.8	I-6	672	10-22-62	37.0	37.0	0.0
G-7	42	11-12-62	32.3	34.2	+1.9	H-7	514	11-1-62	39.2	40.2	+1.0	I-7	774	10-25-62	39.8	38.2	-1.6
G-8	43	11-17-62	34.6	36.0	+1.4												
Current Machine Av.			33.7	34.5	+0.8	Current Machine Av.			38.6	39.5	+0.9	Current Machine Av.			37.6	38.2	+0.6

<sup>a</sup>This difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.



TABLE XXV (Continued)  
INSTITUTE AND MILL CONCORA FLAT CRUSH TEST RESULTS ON INDIVIDUAL ROLLS FOR OCTOBER AND NOVEMBER, 1962

Machine J							Machine K							Machine L						
Concora Flat Crush,							Concora Flat Crush,							Concora Flat Crush,						
Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence	
13	J-4	10-30-62	39.5	36.6	-2.9		K-1	--	10-9-62	35.0	35.6	+0.6		L-1	329	9-26-62	39.2	37.4	-1.8	
14	J-5	11-7-62	36.0	41.2	+5.2		K-2	--	10-10-62	34.4	35.6	+1.2		L-2	330	10-10-62	38.2	39.1	+0.9	
15	J-6	11-12-62	33.1	35.0	+1.9		K-3	--	10-12-62	35.8	37.7	+1.9		L-3	331	10-16-62	42.2	37.4	-4.8	
							K-4	--	10-17-62	35.4	35.0	-0.4		L-4	332	10-24-62	35.8	37.3	+1.5	
							K-5	--	11-8-62	39.7	37.9	-1.8		L-5	333	10-30-62	42.4	42.6	+0.2	
							K-6	--	11-9-62	38.9	40.7	+1.8		L-6	334	11-6-62	37.8	37.4	-0.4	
							K-7	--	11-10-62	36.1	37.3	+1.2		L-7	335	11-14-62	37.8	38.4	+0.6	
							K-8	--	11-11-62	37.9	39.4	+1.5								
Current Machine Av.							36.2	37.6	+1.4	Current Machine Av.							39.1	38.5	-0.6	
Machine M							Machine N							Machine O						
Concora Flat Crush,							Concora Flat Crush,							Concora Flat Crush,						
Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence	
36	M-1	9-22-62	35.5	34.3	-1.2		N-1	802	9-25-62	37.6	37.9	+0.3		O-1	--	10-9-62	38.4	38.2	-0.2	
37	M-2	10-2-62	38.0	36.1	-1.9		N-2	803	9-25-62	37.7	41.2	+3.5		O-2	--	10-10-62	37.4	36.4	-1.0	
38	M-3	10-12-62	36.5	42.6	+6.1		N-3	810	10-25-62	34.7	33.4	-1.3		O-3	--	10-11-62	36.6	37.4	+0.8	
39	M-4	10-22-62	35.4	36.7	+1.3		N-4	811	10-25-62	32.3	32.5	+0.2		O-4	--	10-17-62	40.7	40.2	-0.5	
40	M-5	10-28-62	35.5	35.6	+0.1		N-5	818	10-25-62	35.0	34.0	-1.0		O-5	--	11-8-62	40.3	38.5	-1.8	
41	M-6	11-5-62	34.4	37.8	+3.4		N-6	819	10-25-62	35.2	36.7	+1.5		O-6	--	11-9-62	40.4	39.5	-0.9	
42	M-7	11-12-62	35.2	37.4	+2.2		N-7	826	11-13-62	35.2	34.3	-0.9		O-7	--	11-10-62	39.0	40.1	+1.1	
43	M-8	11-17-62	38.3	40.2	+1.9		N-8	827	11-13-62	35.2	36.1	+0.9		O-8	--	11-13-62	36.7	38.2	+1.5	
Current Machine Av.							36.1	37.6	+1.5	Current Machine Av.							38.7	38.6	-0.1	
Machine Q							Machine R							Machine S						
Concora Flat Crush,							Concora Flat Crush,							Concora Flat Crush,						
Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence	
27	Q-1	9-18-62	38.8	39.5	+0.7		R-1	512	9-19-62	35.4	37.0	+1.6		S-1	676	10-10-62	42.0	40.1	-1.9	
28	Q-2	9-18-62	39.0	39.0	0.0		R-2	513	9-30-62	35.2	38.0	+2.8		S-2	677	10-30-62	40.0	44.3	+4.3	
29	Q-3	9-18-62	38.2	38.9	+0.7		R-3	514	10-7-62	35.8	38.1	+2.3		S-3	678	11-6-62	38.8	40.9	+2.1	
30	Q-4	9-18-62	38.5	39.7	+1.2		R-4	515	10-11-62	37.8	39.0	+1.2		S-4	679	11-13-62	40.2	39.8	-0.4	
							R-5	516	10-15-62	37.7	38.9	+1.2								
							R-6	517	11-2-62	36.8	40.4	+3.6								
							R-7	518	11-7-62	37.2	37.0	-0.2								
Current Machine Av.							38.6	39.3	+0.7	Current Machine Av.							40.2	41.3	+1.1	
Machine T							Machine U							Machine V						
Concora Flat Crush,							Concora Flat Crush,							Concora Flat Crush,						
Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence		Code	Roll No.	Date Made	Insti- tute	p.s.i.	Differ- ence	
219	T-1	9-19-62	34.7	35.6	+0.9		U-1	149	9-17-62	38.2	41.4	+3.2		V-1	78	9-8-62	36.2	36.7	+0.5	
220	T-2	10-4-62	34.8	38.9	+4.1		U-2	150	9-17-62	38.4	46.9	+8.5		V-2	79	9-15-62	32.9	34.6	+1.7	
221	T-3	10-19-62	34.9	37.3	+2.4		U-3	151	9-18-62	38.2	43.5	+5.3		V-3	80	9-17-62	31.3	36.1	+4.8	
							U-4	152	9-18-62	40.4	44.4	+4.0		V-4	81	9-21-62	34.1	35.8	+1.7	
							U-5	153	10-25-62	36.4	42.3	+5.9								
							U-6	154	10-26-62	36.0	37.3	+1.3								
Current Machine Av.							34.8	37.3	+2.5	Current Machine Av.							37.9	42.6	+4.7	
Current Machine Av.							34.8	37.3	+2.5	Current Machine Av.							33.6	35.8	+2.2	

<sup>a</sup>This difference is the amount in p.s.i. units by which the mill result is higher or lower than the Institute result.

TABLE XXVI  
PART I: A COMPARATIVE SUMMARY FOR EACH MACHINE OF THE CONCORA FLAT CRUSH AVERAGES BASED ON INSTITUTE DATA AND THOSE BASED ON MILL DATA

Machine Code	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
Number of Rolls Compared	5	8	8	8	8	6	8	7	7	3	8	7	8	8	8	0	4	7	4	3	6	4
Concora Flat Crush, p.s.i.																						
Current Machine Av. (Institute) <sup>a</sup>	36.6	38.0	31.6	40.0	38.1	33.3	33.7	38.6	37.6	36.2	36.7	39.1	36.1	35.3	38.7	--	38.6	36.5	40.2	34.8	37.9	33.6
Current Machine Av. (Mill) <sup>a</sup>	35.4	36.8	31.9	38.0	37.8	36.2	34.5	39.5	38.2	37.6	37.4	38.5	37.6	35.8	38.6	--	39.3	38.3	41.3	37.3	42.6	35.8
Average Difference <sup>b</sup>	-1.2	-1.2	+0.3	-2.0	-0.3	+2.9	+0.8	+0.9	+0.6	+1.4	+0.7	-0.6	+1.5	+0.5	-0.1	--	+0.7	+1.8	+1.1	-2.5	+4.7	+2.2
Maximum Difference <sup>c</sup>	-2.0	-2.7	+2.7	-6.0	-3.0	+5.9	+1.9	+3.7	+2.7	+5.2	+1.9	-4.8	+6.1	+3.5	-1.8	--	+1.2	+3.6	+4.3	+4.1	+8.5	+4.8

PART II: A TABULATION FOR EACH MACHINE OF THE AVERAGE DIFFERENCE (PER CENT) BETWEEN THE CONCORA FLAT CRUSH BASED ON INSTITUTE DATA AND THAT BASED ON MILL DATA

Average Difference, % <sup>d</sup>																						
Current Report (October and November)	-3.3	-3.2	+0.9	-5.0	-0.8	+8.7	+2.4	+2.3	+1.6	+3.9	+1.9	-1.5	+4.2	+1.4	-0.3	--	+1.8	+4.9	+2.7	+7.2	+12.4	+6.5
97th Report (August and September)	-7.6	+2.6	--	-11.6	-1.6	-3.9	+1.8	+7.5	+3.4	--	+1.7	-2.5	+0.8	-1.1	-2.8	--	+5.5	+3.4	-2.7	+3.0	-12.2	+6.3
96th Report (June and July)	-5.1	+1.6	--	-3.4	+4.3	--	+1.7	+3.6	+5.0	--	+4.6	+2.1	+2.2	-3.4	+0.5	--	+4.0	+3.4	-2.2	+1.4	--	+8.2

<sup>a</sup> Comparisons based on current machine average include only those rolls for which mill data were submitted.

<sup>b</sup> Average difference is the difference between the current machine average based on Institute test results and that based on mill test results with the Institute test results used as the reference. See Table XXV.

<sup>c</sup> Maximum difference is the greatest difference encountered in comparing Institute and mill test averages for individual rolls. See Table XXV.

<sup>d</sup> Average difference (per cent) is computed by dividing the average difference in p.s.i. (shown above in Part I of this table) by the Institute current machine average and multiplying the result by 100.

from the previous bimonthly period are also included. The data shown for the current period indicate that agreement between Institute and mill Concora data was good. It may be seen in Table XXVII that, for the current period, 14.3% of the comparisons of Institute and mill data differed by 1% or less, 47.6% of the comparisons differed by 2.5% or less, and 81.0% of the comparisons differed by 5% or less; agreement at the 1, 2.5, 5, and 10% levels is somewhat better than the agreement for the previous period at these levels. The maximum difference of 12.4% noted for the current period was slightly higher than the maximum difference of 12.2% noted for the previous period.

TABLE XXVII

SUMMARY OF AGREEMENT BETWEEN INSTITUTE AND MILL  
CONCORA FLAT CRUSH DATA

Average Percentage Difference Between Institute and Mill Concora Flat Crush Test Results <sup>a</sup>	Percentage of All Machines Included Within the Indicated Range	
	Previous Period <sup>b</sup>	Current Period <sup>c</sup>
<u>+ 1.0</u>	9.5	14.3
<u>+ 2.5</u>	42.9	47.6
<u>+ 5.0</u>	71.4	81.0
<u>+10.0</u>	90.5	95.2
<u>+12.4</u>	100.0 <sup>d</sup>	100.0


<sup>a</sup>The average obtained at the Institute was used as the reference in the calculation of the percentage differences.

<sup>b</sup>August and September, 1962.

<sup>c</sup>October and November, 1962.

<sup>d</sup>Maximum percentage difference was 12.2.

THE INSTITUTE OF PAPER CHEMISTRY

  
W. N. Hubert, Research Aide  
Container Section

  
R. C. McKee, Container Section